



1           5. The pulsed laser system of claim 1 wherein the  
2 control device allows the primary laser pulse to impinge on  
3 the workpiece by diffracting, deflecting, redirecting, or  
4 shuttering the primary pulse toward the workpiece.

1           6. The pulsed laser system of claim 1 wherein the  
2 control device prevents more than eighty percent of the  
3 secondary laser emission occurring during the emission  
4 period after emission of the primary pulse from impinging on  
5 the workpiece.

1           7. The pulsed laser system of claim 1 wherein the  
2 control device begins preventing secondary laser emission  
3 occurring during the emission period from impinging on the  
4 workpiece immediately after emission of the primary pulse.

1           8. The pulsed laser system of claim 1 wherein the  
2 laser pump comprises a diode pumped system.

1           9. The pulsed laser system of claim 1 wherein the  
2 laser pump comprises a lamp pumped system.

1           10. The pulsed laser system of claim 1 wherein the  
2 switch is a Q-switch.

1           11. The pulsed laser system of claim 10, wherein  
2 the Q-switch is configured to close when it receives a  
3 control signal and to open when the control signal is not  
4 applied to the Q-switch.

1           12. The pulsed laser system of claim 11, wherein  
2 the control signal is a high-frequency signal.

1 13. The pulsed laser system of claim 11, wherein  
2 the control signal is a high-voltage signal.

1 14. The pulsed laser system of claim 11, wherein  
2 the control signal is triggered by a trigger signal.

1 15. The pulsed laser system of claim 1, wherein the  
2 switch is arranged to be closed for a fixed, predetermined  
3 period of time regardless of repetition rate of the primary  
4 laser pulse, over a range of repetition rates.

1 16. The pulsed laser system of claim 15, wherein,  
2 at low repetition rates of the primary laser pulse, the  
3 control device prevents the secondary laser emission  
4 occurring after emission of the primary pulse from impinging  
5 on the workpiece, and, at high repetition rates of the  
6 primary laser pulse, there is no secondary laser emission  
7 occurring during the emission period after emission of the  
8 primary pulse.

1 17. The pulsed laser system of claim 1, wherein the  
2 laser pump is constructed for continuous operation.

1 18. A method of operating a pulsed laser system  
2 comprising the steps of:

3 providing a pulsed laser system comprising a laser  
4 pump, a laser rod, a reflector interposed between the laser  
5 pump and the laser rod, through which energy from the laser  
6 pump enters the laser rod, an output reflector through which  
7 energy is emitted from the laser rod, and a switch  
8 interposed between the laser rod and the output reflector  
9 that, when closed, causes energy to be stored in the laser  
10 rod for a desired period of time and that, when opened,

11 allows energy to be emitted from the laser rod during an  
12 emission period;  
13 operating the pulsed laser system so as to cause  
14 laser energy to be emitted during a plurality of emission  
15 periods;  
16 allowing a primary laser pulse emitted from the  
17 laser rod during each emission period to impinge on a  
18 workpiece; and  
19 preventing at least a portion of secondary laser  
20 emission occurring during each emission period after  
21 emission of the primary pulse from impinging on the  
22 workpiece.

1 19. The method of claim 18, further comprising the  
2 step of closing the switch for a fixed, predetermined period  
3 of time regardless of repetition rate of the primary laser  
4 pulse, over a range of repetition rates.

1 20. The method of claim 19, wherein the fixed,  
2 predetermined period of time is the longest energy storage  
3 period that can be implemented at the highest repetition  
4 rate of the range of repetition rates.

1 21. The method of claim 18, wherein the step of  
2 preventing the secondary laser emission occurring during the  
3 emission period after emission of the primary pulse from  
4 impinging on the workpiece is performed at low repetition  
5 rates of the primary laser pulse, and wherein, at high  
6 repetition rates of the primary laser pulse, there is no  
7 secondary laser emission occurring during the emission  
8 period after emission of the primary pulse.

1 22. The method of claim 18, wherein the step of  
2 allowing the primary laser pulses to impinge on a workpiece  
3 comprises micromachining a worksurface with a controlled  
4 laser pulse width.

1 23. The method of claim 22, wherein the step of  
2 micromachining a worksurface comprises micromachining a  
3 semiconductor circuit on a silicon substrate.

1 24. The method of claim 18, wherein the step of  
2 allowing the primary laser pulses to impinge on a workpiece  
3 comprises trimming of a trimmable component.

1 25. The method of claim 24, wherein the step of  
2 allowing the primary laser pulses to impinge on a workpiece  
3 comprises trimming of a thick-film electrical element.

1 26. The method of claim 24, wherein the step of  
2 allowing the primary laser pulses to impinge on a workpiece  
3 comprises trimming of a thin-film electrical element.

1 27. The method of claim 24, wherein the step of  
2 allowing the primary laser pulses to impinge on a workpiece  
3 comprises trimming of a resistor.

1 28. The method of claim 24, wherein the step of  
2 allowing the primary laser pulses to impinge on a workpiece  
3 comprises trimming of a capacitor.

1 29. The method of claim 24, wherein the step of  
2 operating the pulsed laser system comprises operating the  
3 laser pump continuously.

1 30. A method of operating a pulsed laser system,  
2 comprising the steps of:  
3 providing a pulsed laser system comprising a laser  
4 pump, a laser rod, a reflector interposed between the laser  
5 pump and the laser rod, through which energy from the laser  
6 pump enters the laser rod, an output reflector through which  
7 energy is emitted from the laser rod, and a switch  
8 interposed between the laser rod and the output reflector  
9 that, when closed, causes energy to be stored in the laser  
10 rod for a desired period of time and that, when opened,  
11 allows energy to be emitted from the laser rod during an  
12 emission period; and

13 operating the pulsed laser system, over a range of  
14 repetition rates, so as to cause laser energy to be emitted  
15 during a plurality of emission periods at each repetition  
16 rate, at least a portion of the laser energy emitted during  
17 the emission periods being directed toward the target  
18 structure;

19 the step of operating the pulsed laser system  
20 comprising closing the switch for a fixed, predetermined  
21 period of time prior to each emission period regardless of  
22 repetition rate of the primary laser pulse within the range  
23 of repetition rates;

24 the step of operating the pulsed laser system  
25 further comprising operating the pump continuously at  
26 constant power.

1 31. The method of claim 30, wherein the step of  
2 directing at least a portion of the laser energy emitted  
3 during the emission periods toward the target structure  
4 comprises performing functional or passive trimming of the  
5 target structure.

1 32. The method of claim 30, wherein the step of  
2 operating the pulsed laser system comprises trimming of a  
3 trimmable component.

1 33. The method of claim 32, wherein the step of  
2 operating the pulsed laser system comprises trimming of a  
3 thick-film electrical element.

1 34. The method of claim 32, wherein the step of  
2 operating the pulsed laser system comprises trimming of a  
3 thin-film electrical element.

1 35. The method of claim 32, wherein the step of  
2 operating the pulsed laser system comprises trimming of a  
3 resistor.

1 36. The method of claim 32, wherein the step of  
2 operating the pulsed laser system comprises trimming of a  
3 capacitor.

1 37. The method of claim 32, wherein the step of  
2 operating the pulsed laser system comprises micromachining a  
3 worksurface.

1 38. The method of claim 37, wherein the step of  
2 micromachining a worksurface comprises micromachining a  
3 semiconductor circuit on a silicon substrate.

1 39. The method of claim 32, wherein the step of  
2 operating the pulsed laser system comprises operating the  
3 laser pump continuously.

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